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09/483,569	01/14/2000	Stehpen S. Oh	TI-23373	8551

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TEXAS INSTRUMENTS INCORPORATED
P O BOX 655474, M/S 3999
DALLAS, TX 75265

EXAMINER	
SMITS, TALIVALDIS IVARS	
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AND INTERFERENCES

Paper No. 11

Application Number: 09/483,569

Filing Date: January 14, 2000

Appellant(s): Stephen S. Oh et al.

MAILED

MAY 07 2003

Technology Center 2600

Robert D. Marshall, Jr.

For Appellant

EXAMINER'S ANSWER

This is in response to the appeal brief filed March 18, 2003.

(1) Real Party in Interest

A statement identifying the real party in interest is contained in the brief.

(2) Related Appeals and Interferences

Applicant states that there are no related appeals nor interferences.

(3) Status of Claims

The statement of the status of the claims contained in the brief is correct.

(4) Status of Amendments After Final

The appellant's statement of the status of the Amendment after final rejection contained in the brief is basically correct, for said Amendment was entered in the Advisory Action, canceling claims 6, 14, and 17-22.

(5) Summary of Invention

The summary of invention contained in the brief is correct.

(6) Issues

The appellant's statement of the issues in the brief is correct.

(7) Grouping of Claims

The rejection of claims 1-3 and 9-11 stand or fall together because appellant's brief groups them together as Group I.

(8) Claims Appealed

The copy of the appealed claims contained in the Appendix to the brief is correct.

(9) Prior Art of Record

The following is a listing of the prior art of record relied upon in the rejection of claims under appeal.

6,070,137	BLOEBAUM et al.	1-1998

(10) Grounds of Rejection

The following ground(s) of rejection are applicable to the appealed claims:

Claim Rejections - 35 USC § 103

The text of the section of Title 35, U.S. Code not included in this action can be found in a previous Office Action.

Claims 1-3 and 9-11 are rejected under 35 U.S.C. 103(a) as being unpatentable over Leland S. Bloebaum *et al.* (U.S. Patent 6,070,137, filed January 7, 1998).

As per claims 1 and 9, Bloebaum *et al.* teach:

- receiving a stream of sampled acoustic signals (sampler, Fig. 3, element 26);
- selecting a fixed number of samples by multiplying the samples by a windowing function (signals converted into frames, col. 4, lines 24-25);
- computing the Fast-Fourier-Transform (DFT, Figure 3, element 42 with col. 5, lines 10-11);
- selecting half the Fourier-transformed windowed signal data (single-sided, frequency-domain representation because of the complex-conjugate symmetry of a Fast Fourier Transform of real signals, col. 5, lines 8-10);
- computing a power estimate (power spectral density, col. 5, lines 17-19);
- smoothing the power estimate over time to calculate a time-smoothed signal estimate (Fig. 5, element 64 with "smoothed versiion of S" in col. 8, lines 6-8; *cf.* first-order AR smoothing, col. 5, lines 38-44, noting that S is signal power with signal present and noise power when signal is absent)
- calculates a gain function from the signal and noise power estimates (enhancement filter, col. 6, lines 8-10); and
- calculating a transformed signal by multiplying the transformed window signal by the gain function (col. 6, line 35-41).

Bloebaum *et al.* are interested in speech (voice) *coding* rather than speech *decoding*, and thus do not explicitly teach calculating an (enhanced) speech signal by doing an inverse FFT on the transformed window signal. However this is suggested by them, since an artisan at the time of invention would have known, from her digital signal analysis course, to inverse-FFT the

transformed enhanced speech signal to obtain back a time-domain version thereof, for playback to the listener.

As per claims 2 and 10, Bloebaum *et al.* do not teach a frame size of 32 samples. However, it would have been obvious for an artisan at the time of invention to use a "power of two" sample size to enable FFT processing, and 32 samples would correspond to somewhere between 5 and 2.5 milliseconds of speech data, one of the well-known standard speech frame sizes (5, 10, 20 milliseconds). It would have been obvious for an artisan at the time of invention to use standard speech frame sizes so as to enable her to use conveniently-available standard signal processing hardware and software.

As per claims 3 and 11, Bloebaum *et al.* do not say what inherent window they are using. However, an artisan at the time of invention would have known to use a Hanning (raised cosine) window because of its notoriously well-known convenience of enabling "unwindowing" by addition after inverse FFT when using 50 percent Hanning time window overlap.

(11) Response to Argument

Applicants argue that "Bloebaum et al clearly teaches smoothing of the vector N from noise model adaption block 46 as a function of the prior noise vector N and the vector S. This is not smoothing the power estimate as claimed." (Appeal Brief, p. 4). The examiner disagrees, and asserts that Bloebaum et al. teach *both* signal power smoothing (variance reduction, Fig. 5, element 64 with col. 8, lines 6-8) as well as said noise power smoothing, noting that the Voice

Activity Detector (Fig. 3, element 28, whose flag indicates whether there is signal or only noise coming out of the sampler, element 26 and being input to the "Noise Model Adaption" processor (element 46)) helps said adaption processor distinguish and do separate bookkeeping on signal power and noise power data, so that the "N" output therefrom would be smoothed signal or smoothed noise, depending on the VAD flag (note that the signal S is input thereto).

For the above reasons, it is believed that the rejections should be sustained.

Respectfully submitted,

TĀLIVALDIS IVARS ŠMITS
PRIMARY EXAMINER

April 29, 2003

Conferees

Marsha D. Banks-Harold, SPE Marsha D Banks-Harold

Vijay B. Chawan Vijay B Chawan

Tālivaldis Ivars Šmits